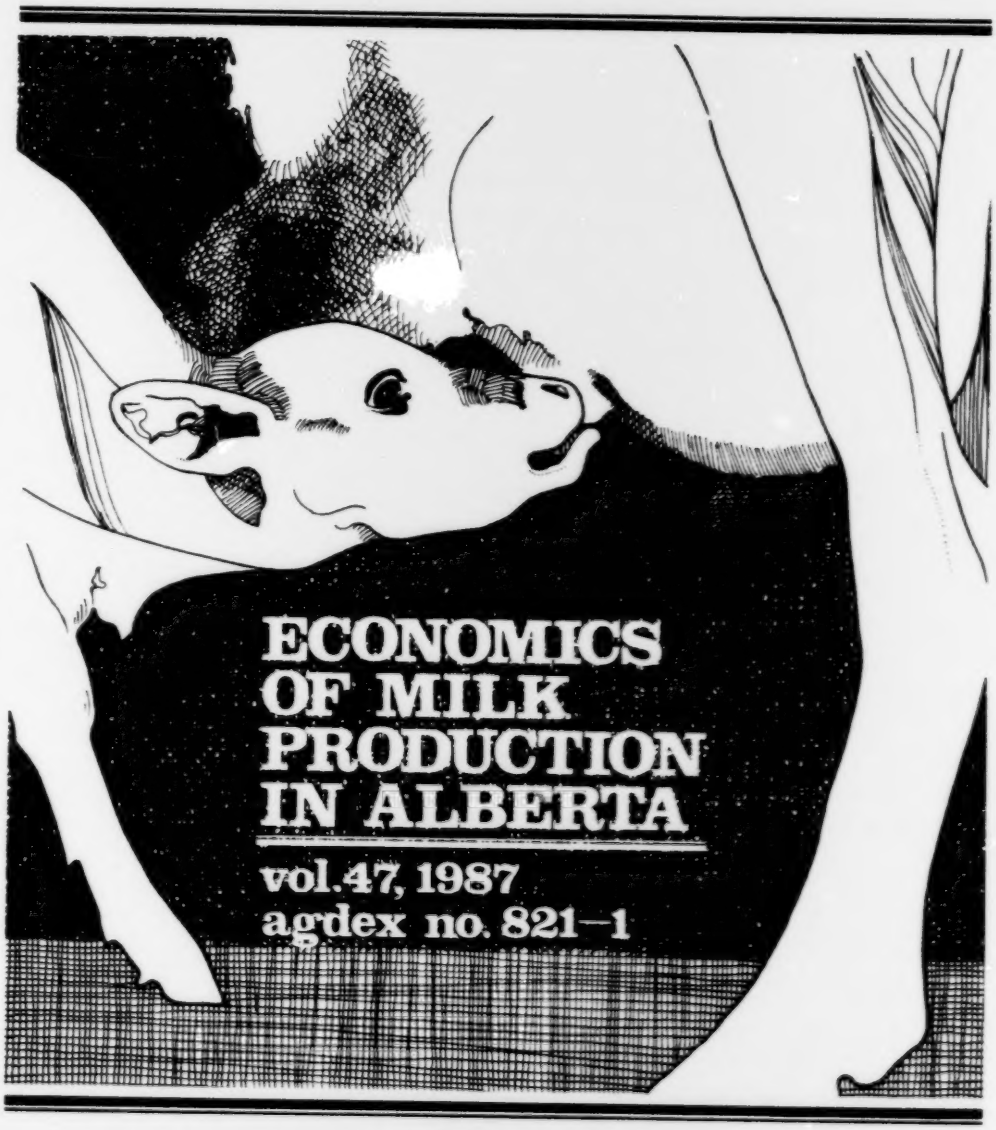

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ECONOMICS OF MILK PRODUCTION IN ALBERTA, 1987

Volume 47

By
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Alberta Department of Agriculture
April, 1988

FOREWORD

Pricing of fluid milk in Alberta is regulated by the Public Utilities Board (PUB). The Production and Resource Economics Branch conducts an annual study of dairy production costs and returns in Alberta to assist the PUB in administering fluid milk prices. This annual Dairy Cost Study was introduced during World War II and is now recognized by dairymen, consumers and the PUB as the primary reference for setting fluid milk prices.

In addition to the Dairy Cost Study, the branch has developed a computerized formula which monthly monitors producer costs. The formula enables the PUB to make more frequent adjustments to the producer price in response to changes in production costs during the year. Further adjustment to the producer price can be made when the annual Dairy Cost Study is completed.

The 1987 cost of producing fluid milk remained quite stable compared to 1986. The increase was less than one per cent. Return to equity also remained relatively unchanged at 16.5 per cent, compared to 16.6 per cent 1986.

Dr. Carlyle Ross, Head
Production Economics Branch

NOTE

This report was prepared from farm records of a selected number of fluid milk producers in Alberta who voluntarily participated in this project. Their participation was greatly encouraged by the Alberta Fluid Milk Producers' Association. The Alberta Dairy Control Board provided the financial compensation to the participating producers. Allan Presiznuk from Production and Resource Economics Branch collected and assisted with the computerization of the farm data; he also maintained personal contact with the producers throughout the year.

Rudy Susko

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I. INTRODUCTION

This study is an annual economic analysis of milk production on Alberta farms. Prior to 1974 the findings of these studies were used as the documented evidence at the Public Utilities Board hearings to set the producer price. Although a formula pricing system was adopted in November 1974 the significance of this study in overall pricing mechanism, remains undiminished.

More specifically the objectives of the study are:

- to provide a continuing account of the costs and economic conditions encountered in the production of fluid milk in Alberta.
- to annually monitor the performance of the fluid milk formula pricing.
- to use the findings as a basis for the revision in the formula price.
- to provide the data for the extension use, for example, farm management.
- to provide the participating dairy farmers with a personal business analysis for management purposes.

The cost of production account is a vital economic indicator in milk pricing because of the supply management nature of the industry.

II. METHOD OF ANALYSIS

Many approaches may be used to establish the cost of production on the farm. The approach taken in this study is to show the actual cost outlays taken from the farm records for a given production year. A computer program is utilized to summarize the data and calculate the weighted group averages.

The study emphasizes the overall provincial situation supported by the regional data. Since the study is annual and ongoing, the current year is compared with the previous year to make the results more meaningful. Using this approach, the information is expressed in production units such as per hectolitre of milk and per cow.

Preliminary quarterly analyses are made during the year to observe seasonal effects. However, emphasis is on the full year's operation.

1. Enterprise Identification -- There are many accounting approaches for calculating the farm cost of producing fluid milk. Some use the total farm approach, with dairy costs intermingled with others. Others use the different imputed cost items such as operating interest cost or management charge. In Alberta the dairy enterprise is defined as all activities associated with milking cows, dry cows and young dairy stock. In most cases, the dairy operator raises his own feed; the inputs of production are allocated to the dairy enterprise and the total farm according to the actual use. Consequently, the final costs of producing milk are the true costs associated only with milk production.

2. Inventory Adjustment -- Since the cost of raising young dairy stock is included in the cost of milk production, the total income includes net cattle sales and net inventory increases to show the herd growth. The cattle inventory increases are determined by subtracting the beginning year inventory from the year-end inventory. The gross income is thus composed of milk sales and inventory adjustment. If the inventory adjustment per hectolitre of milk is excluded from the income the result is the blend price and subsidy received for milk.

3. Home Grown Feed -- The hay grown on the farm and fed to dairy livestock is valued at regional values of hay in the stack on the farm; feed grain is valued at elevator prices provided by the Alberta Grain Commission. Although hay and grain could be grown on the same farm, both are considered to be purchased from the crop enterprise. The total value of home grown feed is determined by applying the regional price to the actual quantity fed. The procedure adequately compensates for the production cost of growing home feed. The cost of purchased feed is accepted at the actual value spent each month.

4. Value of Investment and Depreciation -- The cost of production and other relevant data from this report are supposed to reflect the average conditions in the industry. The value of depreciation is based on the original value of buildings and machinery. There is also a need to estimate the current market value of the facility to determine the equity position. The market value is computed from the original value of dairy capital by updating with the inflation factors and then depreciating according to the number of years in use. This value is used for calculating the return to equity. The age of the facility is indicated by the sample of participating producers representing the total industry. The farmland is not considered as a dairy investment. Only the acreage for dairy buildings and corral location is included in the dairy. The dairy livestock inventory is valued at the prevailing market prices at the beginning of the year.

5. Imputed Costs -- There are two basic alternatives to value the economic well being of the farm enterprise. A. to determine the return to family labour including the operator labour input, and B. to determine the return to equity invested in each particular enterprise. The methods, as identified in Table 1, are quite compatible and in each case some major assumptions must be made. In alternative A where the residual is return to family labour, the equity interest must be imputed in order to arrive at the total cost of production. The actual residual can then be measured in terms

of dollars per hour of labour. On the other hand, using alternative B, the value of family labour must be imputed since there is usually no value attached to this input.

In this study the principles of the alternative B are used, i.e. the objective is to determine the percentage return to equity. The imputed value of family labour is included in the operating or variable costs. This is more practical for a number of reasons: i) incorporated farms usually allocate total labour expenses including family, ii) in reality the operator is using money during the year for living expenses and thus the imputed family labour value is compensating for this, iii) imputed interest or opportunity cost on equity, used in alternative A is a controversial issue in a period of persistent inflation of capital assets. The charges for rent are included in the cost of capital. The capital cost in this context represents the cost of ownership of resources. If resources are rented there is a charge for their use; on the other hand if resources are owned the owner must bear the cost of depreciation and interest on debt. For group averages such classification of variable (or operating) and capital cost is very suitable.

a) Operator and family labour: the operator's actual labour may vary from almost nil on some dairy farms to the total input of labour on others. Our procedure has been to obtain a statement of the operator's labour in hours per month, then apply the rate paid for full time dairy labour (including room and board).

   In determining the hourly value, 2500 hours is considered to be the working time for one man-equivalent in a 12-month period. By this method, it is felt that the process of valuing the operator's labour is equitable. This method is preferred over leaving it as a residual because of the great variability in labour time between operators. Family labour is evaluated similar to the above, but with different wage rates according to age and working responsibilities.

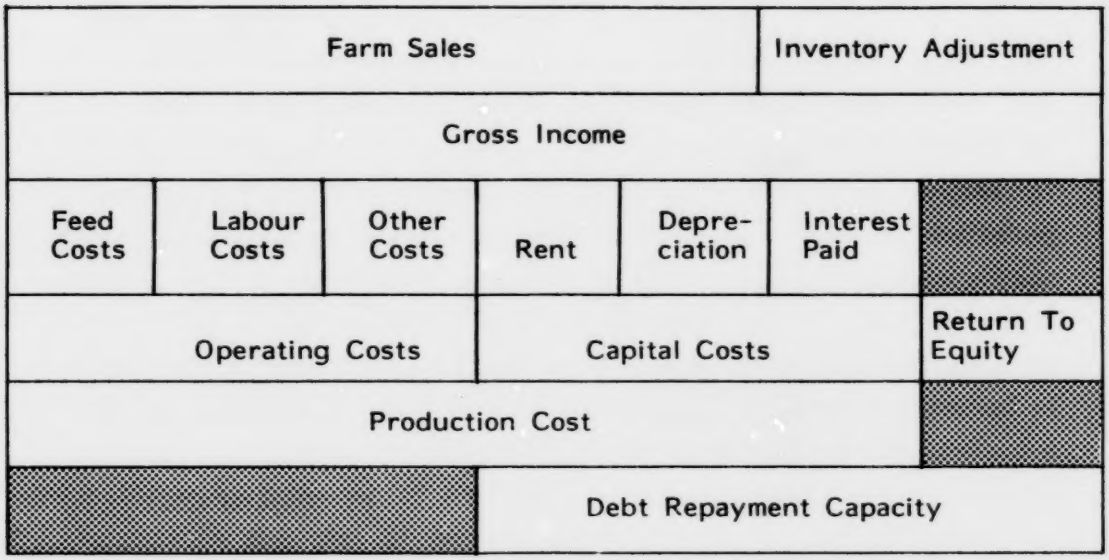
TABLE 1 ALTERNATIVE RETURNS

A. LABOUR		B. CAPITAL	
a)	Gross Income	a)	Gross Income
	Feed		Feed
	Other		Other
	Hired Labour		Hired Labour
	-		Family Labour (imputed)
b)	Operating Cost	b)	Operating Cost
	Rent		Rent
	Depreciation		Depreciaton
	Paid Interest		Paid Interest
	Equity Interest (Imputed)		-
c)	Capital Cost	c)	Capital Cost
	Return to Family Labour		Return to Equity

b) Interest on Capital: the actual interest paid on existing liabilities is included in the capital cost. To obtain this value, the participating producers were asked to report their outstanding liabilities and the interest rates they paid. This method is more accurate than reporting the annual interest payment sum. The total operating cost, plus the capital cost, account for total enterprise outlays and if subtracted from the gross income, the bottom line residual is the return on equity. The return on equity is not imputed but is left as a residual to measure the economic well-being of a farmer. If this residual is expressed as a percentage of the equity capital, then the actual return on equity could be compared with some alternative opportunity income which could be expected from Canada Savings Bonds or term deposits.

6. The production cost concept: The concept of cost accounting in farming is not the same in all provinces. In Alberta, the following production cost concept is used:

DIAGRAM 1


Farm Sales
Inventory Adjustment
Gross Income
Feed Costs
Labour Costs
Other Costs
Rent
Depre-ciation
Interest Paid
Operating Costs
Capital Costs
Return To Equity
Production Cost
Debt Repayment Capacity

III. DATA COLLECTION

In order to obtain accurate dairy information from primary milk producers, all producers on the study are required to complete a detailed questionnaire of their dairy production activities each month. This questionnaire is shown in Appendix D of this report.

Research assistants collect the data, monitor the monthly collection and audit the data. This procedure ensures promptness in data collection and a minimum of recording error. The information is then entered into the computer. The computer output shown in Appendix A, B and C serves as supporting data for the report.

The analysis is based on data from fluid milk producers. Consequently the results indicate the cost level of producing fluid milk rather than industrial. The cost level for industrial milk might differ from fluid, but the difference is not substantial.

Fifty-nine dairy producers across the province submitted business information for the calendar year 1987. Two regions are recognized for the purpose of analysis. The region lying north of 39th township is called Northern Alberta and is represented by 35 producers; the region south of the 39th township is referred to as Southern Alberta and is represented by 24 producers. The producers submitted business accounts throughout the year.

Sample

While the number of participants can change because of unforeseen circumstances, the sample size is determined statistically every year. It was established that the variance of cost of producing milk in the population of fluid milk shippers was $3.75/hL. The desired variation

was assumed to be 20 cents. The sample size was then determined by the formula.[1]

The study was designed to represent a cross-section of the producers by the milk quota size. The provincial fluid milk shippers were arranged according to the quota size from largest to smallest in each of the two regions, Southern Alberta and Northern Alberta. The sample was selected by systematic sampling to provide better representation of the population. The average quota and herd size of the sample was 730 litres and 56 cows respectively. The sample size of 70 producers was determined to be statistically sufficient to represent the total population of fluid milk shippers. Out of that group 59 producers completed reports for the 12-month period needed for the study. Some characteristics of the sample are shown in the following table.

TABLE 2 1987 SAMPLE CHARACTERISTICS

Years in Dairy	Total Sample	Indebtedness (30%)		Farm Size (40)	
		Less Than	More Than	Less Than	More Than
	- - - - - - - - percent of the sample - - - - - - - -				
Total Sample (%)	100	50	50	19	81
Less than 10	34	29	71	9	91
More than 10	66	61	39	24	76

Production Conditions[2]

Pastures and hay fields started the year in good condition with ample moisture. The dry windy conditions in May and June stunted growth in all Regions except the North West. By the end of June it

---

1 $$n = \frac{4 \times s^2}{L^2} \div (1 + \frac{n}{N})$$

Where: n is sample size
N is population size
s is standard deviation of population
L is expected accuracy of sample.

2 As reported by Statistics Branch of Alberta Agriculture.

looked like hay yields would be about half normal levels in most areas and pastures had deteriorated to poor condition. The rains of July and August showed the resilience of these perennial crops. Despite dry early season conditions, the average hay yield was 2.07 tons per acre. Total hay production was a record 9 million tons due to an increase in area. This production level exceeded the long term provincial average of 1.8 tons per acre. The 1987 growing season produced abundant supplies of fodder and feed grain, which were reported at adequate to surplus levels across most of Alberta. The quality of fodder and feed grain was rated as fair to good.

The only area which reported a fodder shortage was the North East Region along the Saskatchewan border. Vegreville, Viking, Provost and Acadia Valley reported possible shortfalls in hay and greenfeed supplies. There was also a shortage of feed oats reported at several scattered locations across Alberta. Mild fall weather reduced the demand for feed, as cattle were still grazing in some areas during December. Given the surplus stocks and mild winter there was a feed carryover to spring.

Fall conditions allowed for completion of the 1987 harvest in all Regions. Producers were able to work into early November due to exceptionally warm dry weather. This allowed most farmers to finish all desired fall operations.

The major concern was soil moisture. After ten weeks with mild temperatures and no rain most areas reported poor surface moisture conditions. In the areas east of Edmonton and Calgary, and in the Peace River Region subsurface moisture was rated as fair to poor. By year end most Regions were dependent on spring rains to produce sufficient moisture for the 1988 crop.

IV. ANALYSIS OF RESULTS

Income

The program of supply management of fluid milk in Alberta is administered by the Alberta Dairy Control Board. Fluid milk quotas held by the producers are assigned by the Board to the processing plants. The minimum fluid milk prices at farm, wholesale and retail levels are established by an independent Public Utilities Board. (PUB). The PUB uses a fluid milk price formula[3] to establish the monthly farm price. The producer price changed twice in 1987. In June the price was reduced by one dollar and then in September it was raised back by one dollar. The chronology of the price changes are shown in Table 3.

TABLE 3 FLUID MILK PRICE CHANGES IN 1987

Effective Date	Producer Price $/hL	Wholesale Price ¢/L	Retail Price ¢/L
December 31, 1986	48.13	79	85
June 15, 1987	47.15	78	84
September 14 1987	48.13	79	85
Average	47.90	78.75	84.75

3 The Alberta milk price formula was first adopted in November 1974; there was a major revision on July 1, 1980. A concise description of the formula is given in Appendix E.

Fluid milk sales remained virtually unchanged from the previous year at 258.6 million litres as compared to 258.0 million litres in 1986.

The utilization of assigned fluid milk quota in 1987 was 75.4 per cent compared to 75.5 per cent in 1986, almost unchanged.

Fluid milk producers shipping milk in excess of designated Class 1 (fluid) milk received a $6.04 per hectolitre (hL) subsidy if the milk was covered by national market share quota. The subsidy was paid in addition to industrial milk prices. Of this subsidy, the Canadian Dairy Commission (CDC) held back a levy of $4.42 per hectolitre to pay the support program expenses. In addition to the levy, the CDC continued to impose a 30-cent skim-off levy on fluid milk deliveries.

The over-quota levies collected during the year are usually refunded depending on the provincial quota situation on July 31 (dairy year end). In 1987 the Alberta total deliveries exceeded the MSQ by 2.8 per cent, therefore, as in 1986, there was only a partial refund to the producers.

The diagram on the following page summarizes the quantity, price and utilization of milk in Alberta.

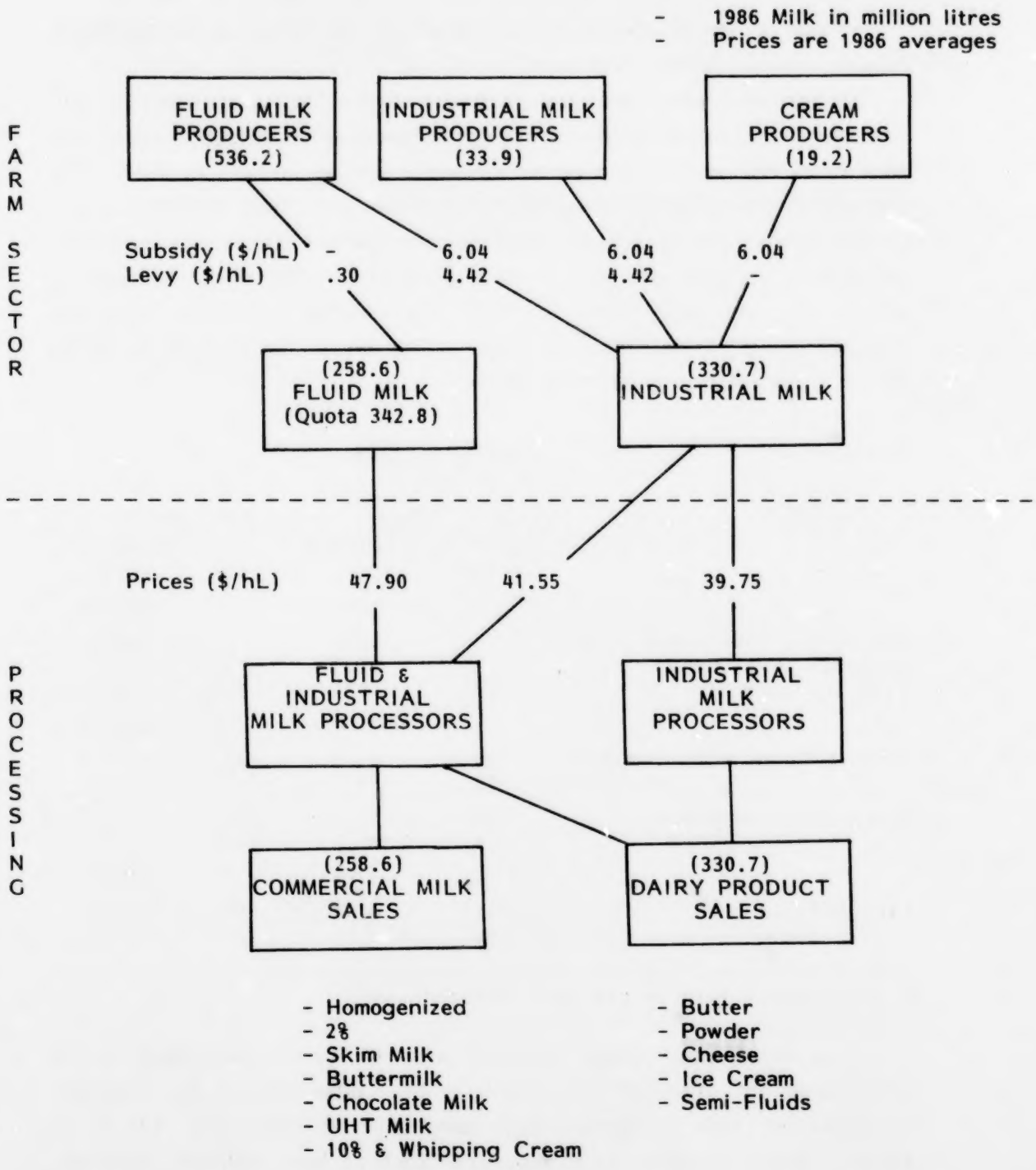
Table 5 portrays the cost of producing milk for the dairy enterprise in Alberta; for comparison Tables 6 and 7 display the results of Northern and Southern regions respectively. Gross income is the sum of milk sales and value for inventory adjustment. During the 1987 production year, the price of fluid milk was first reduced and then increased back to the same amount. This resulted in a lower blend price for all classes of milk in 1987. The fluid blend price of $44.90 per hectolitre of milk sold was 57 cents lower than the 1986 price. The fluid milk utilization of assigned fluid quota did not play a significant role in reduction of milk price in 1987. In over all, dairy producers in Alberta paid more levies than they received in milk subsidies in 1987. There was also a dramatic drop in non-milk assistance caused especially by the expiry of drought assistance. Consequently, the miscellaneous receipts were reduced from $1.71 per hectolitre in 1986 to $0.28 in 1987.

Due to a slight cow productivity decrease (1.5 per cent) in 1987 compared to 1986, there were no gains in income per cow.

Inventory adjustment or the value for herd growth and credits increased in 1987 by $14.01 per cow to $254.66 or 3.99 per hectolitre.

The gross income per hectolitre of milk sold averaged $48.76, down 0.8 per cent from $49.16 in 1986.

DIAGRAM 2


- 1986 Milk in million litres
- Prices are 1986 averages
FARM SECTOR
FLUID MILK PRODUCERS (536.2)
INDUSTRIAL MILK PRODUCERS (33.9)
CREAM PRODUCERS (19.2)
Subsidy ($/hL) - 6.04 6.04 6.04
Levy ($/hL) .30 4.42 4.42 -
(258.6) FLUID MILK (Quota 342.8)
(330.7) INDUSTRIAL MILK
Prices ($/hL) 47.90 41.55 39.75
PROCESSING
FLUID & INDUSTRIAL MILK PROCESSORS
INDUSTRIAL MILK PROCESSORS
(258.6) COMMERCIAL MILK SALES
(330.7) DAIRY PRODUCT SALES
- Homogenized
- 2%
- Skim Milk
- Buttermilk
- Chocolate Milk
- UHT Milk
- 10% & Whipping Cream
- Butter
- Powder
- Cheese
- Ice Cream
- Semi-Fluids

Production Costs

Table 4 shows the average values of the three most significant inputs; capital, labour and feed.

Investment value per cow increased in the 1987 sample by 3.4 per cent over the previous year, while indebtedness increased from 27 per cent to 35 per cent. Feed prices showed a further decline in 1987. The concentrate blend price dropped by 14.5 per cent from the 1986 price. In addition to the decline of grain prices, the $13.00 feed grain market adjustment program was a contributing factor. The drop in roughage prices was also significant in 1987, the average value for roughage dropped by 21.7 per cent in 1987. The hourly rate paid for hired labour increased, from $6.34 to $8.19.

TABLE 4: INPUT PRICES

	1986		1987	
	% Use	Average Price	% Use	Average Price
		-$/cow-		-$/cow-
Depreciable Investment		2958		2887
Livestock Investment		2095		2114
Total Investment	27*	5174	35*	5347
		-$/tonne-		-$/tonne-
Grain & Concentrate-homegrown	27	61.3	33	45.1
-purchased	73	169.5	67	156.8
Roughage -homegrown	78	72.7	81	58.6
-purchased	22	102.7	19	77.1
		-$/hr-		-$/hr-
Labour -hired	31	6.34	29	8.19
-family	69	7.25	71	7.52

* Debt/capital ratio or per cent indebtedness.

The above input prices, together with the input volume used on the farm made up the cost structure. The total production cost per hectolitre of milk increased only marginally in 1987 from $39.43 to $39.77. While the dairy cash expenses, such as fuel, utilities, medicine, etc. remained almost unchanged at $10.56 per hectolitre, the feed cost

registered the highest decline of 13.0 per cent from $14.32 per hL to $12.46. The feed cost in 1987 accounted for a mere 25.5 per cent of income, down from 29.1 per cent a year ago.

The labour cost increased in 1987 to $9.76 per hectolitre, accounting for 20.0 per cent of income, up from $8.43 in 1986. Both wage rate and labour use increased in 1987 by 10.7 and 3.2 per cent respectively. The higher indebtedness of 1987 sample producers was responsible for a 8.7 per cent increase in the cost of capital.

The total production cost was $39.77 per hectolitre, a slight increase over $39.43 in 1986.

TABLE 5

ALBERTA AVERAGE

***** DAIRY ENTERPRISE COSTS AND RETURNS *****

	PER HL. SOLD	PERCENT FROM INCOME	PER HL. SOLD	PERCENT FROM INCOME
INCOME:	1986		1987	
MILK SALES	45.75		44.90	
MILK SUBSIDY	3.31		3.48	
MILK LEVIES (-)	-2.23		-3.70	
MISCELLANEOUS RECEIPTS	-2.62		-3.61	
NET CATTLE SALES (+-)	1.71		0.28	
NET INVENTORY INCREASE (+-)	3.56		3.19	
	-0.37		0.52	
GROSS INCOME	49.16	100.00	48.76	100.00
EXPENSES:				
GRAIN	1.36		1.32	
COMPLETE FEED	4.60		3.61	
SUPPLEMENT	0.64		1.14	
MINERALS & VITAMINS	0.25		0.27	
ROUGHAGE	7.04		5.70	
PASTURE	0.36			
PROCESSING COSTS	0.08		0.09	
TOTAL FEED COSTS	14.32	29.14	12.46	25.55
BEDDING AND SUPPLIES	1.19		1.24	
VET. AND MEDICINE	1.22		1.27	
MILK HAULING	1.62		1.68	
PRODUCER'S FEES	0.80		0.75	
UTILITIES	1.09		1.08	
FUEL, OIL, LUBE	0.57		0.54	
BLDG. & MACH. REPAIRS	1.93		1.79	
TAXES AND INSURANCE	0.58		0.64	
MISCELLANEOUS	1.25		1.57	
DAIRY CASH COSTS	10.24	20.83	10.56	21.65
HIRED LABOR	2.40		3.03	
FAMILY LABOR	6.03		6.73	
TOTAL LABOR COSTS	8.43	17.15	9.76	20.01
TOTAL OPERATING COSTS	32.99		32.78	
RENT	0.26		0.46	
DEPRECIATION	3.95		3.80	
INTEREST (CAP.DEBT)	2.22		2.74	
TOTAL CAPITAL COSTS	6.44	13.09	7.00	14.35
TOTAL PRODUCTION COST	39.43	80.20	39.77	81.56
RETURN TO CAPITAL	16.17		15.99	
RETURN TO EQUITY	9.73	19.80	8.99	18.44
MILK PRICE	45.44		44.77	
INVENTORY ADJUSTMENT	3.72		3.99	
INTEREST ON EQUITY (%)	16.57		16.47	
INTEREST ON DEBT (%)	10.42		9.39	

TABLE 6 **NORTHERN ALBERTA AVERAGE**

******* DAIRY ENTERPRISE COSTS AND RETURNS *******

	PER HL. SOLD	PERCENT FROM INCOME	PER HL. SOLD	PERCENT FROM INCOME
INCOME:	1986		1987	
MILK SALES	45.81		44.94	
MILK SUBSIDY	2.39		2.58	
MILK LEVIES (-)	-3.83		-3.68	
MISCELLANEOUS RECEIPTS	1.81		0.27	
NET CATTLE SALES (+-)	2.50		2.71	
NET INVENTORY INCREASE (+-)	-0.71		0.97	
GROSS INCOME	48.88	100.00	48.80	100.00
EXPENSES:				
GRAIN	1.37		1.35	
COMPLETE FEED	3.62		3.01	
SUPPLEMENT	0.88		1.63	
MINERALS & VITAMINS	0.26		0.30	
ROUGHAGE	6.59		5.69	
PASTURE	0.39			
PROCESSING COSTS	0.11		0.14	
TOTAL FEED COSTS	13.22	27.04	12.11	24.82
BEDDING AND SUPPLIES	1.21		1.19	
VET. AND MEDICINE	1.19		1.32	
MILK HAULING	1.54		1.60	
PRODUCER'S FEES	0.90		0.87	
UTILITIES	1.09		1.05	
FUEL, OIL, LUBE	0.68		0.55	
BLDG. & MACH. REPAIRS	2.18		1.92	
TAXES AND INSURANCE	0.62		0.65	
MISCELLANEOUS	1.07		1.58	
DAIRY CASH COSTS	10.47	21.42	10.73	21.99
HIRED LABOR	2.38		3.04	
FAMILY LABOR	6.58		7.25	
TOTAL LABOR COSTS	8.97	18.35	10.29	21.08
TOTAL OPERATING COSTS	32.65		33.13	
RENT	0.35		0.45	
DEPRECIATION	4.09		3.85	
INTEREST (CAP.DEBT)	2.48		2.94	
TOTAL CAPITAL COSTS	6.91	14.14	7.24	14.84
TOTAL PRODUCTION COST	39.56	80.95	40.37	82.73
RETURN TO CAPITAL	16.22		15.67	
RETURN TO EQUITY	9.31	19.05	8.43	17.27
MILK PRICE	45.27		44.85	
INVENTORY ADJUSTMENT	3.60		3.95	
INTEREST ON EQUITY (%)	15.75		15.25	
INTEREST ON DEBT (%)	10.82		9.52	

TABLE 7 **SOUTHERN ALBERTA AVERAGE**

******* DAIRY ENTERPRISE COSTS AND RETURNS *******

	PER HL. SOLD	PERCENT FROM INCOME	PER HL. SOLD	PERCENT FROM INCOME
INCOME:	1986		1987	
MILK SALES	45.66		44.86	
MILK SUBSIDY	2.20		2.38	
MILK LEVIES (-)	-2.20		-2.54	
MISCELLANEOUS RECEIPTS	1.59		0.29	
NET CATTLE SALES (+-)	2.22		3.71	
NET INVENTORY INCREASE (+-)	0.08		0.03	
GROSS INCOME	49.55	100.00	48.72	100.00
EXPENSES:				
GRAIN	1.35		1.29	
COMPLETE FEED	5.90		4.87	
SUPPLEMENT	0.32		0.68	
MINERALS & VITAMINS	0.24		0.24	
ROUGHAGE	7.63		5.71	
PASTURE	0.31			
PROCESSING COSTS	0.03		0.04	
TOTAL FEED COSTS	15.79	31.87	12.84	26.35
BEDDING AND SUPPLIES	1.17		1.29	
VET. AND MEDICINE	1.26		1.21	
MILK HAULING	1.73		1.77	
PRODUCER'S FEES	0.67		0.63	
UTILITIES	1.03		1.11	
FUEL, OIL, LUBE	0.43		0.52	
BLDG. & MACH. REPAIRS	1.61		1.65	
TAXES AND INSURANCE	0.54		0.62	
MISCELLANEOUS	1.49		1.55	
DAIRY CASH COSTS	9.93	20.05	10.37	21.28
HIRED LABOR	2.37		3.01	
FAMILY LABOR	5.32		6.18	
TOTAL LABOR COSTS	7.70	15.53	9.19	18.86
TOTAL OPERATING COSTS	33.42		32.39	
RENT	0.16		0.46	
DEPRECIATION	3.77		3.75	
INTEREST (CAP.DEBT)	1.87		2.52	
TOTAL CAPITAL COSTS	5.80	11.71	6.73	13.81
TOTAL PRODUCTION COST	39.23	79.16	39.12	80.30
RETURN TO CAPITAL	16.13		16.33	
RETURN TO EQUITY	10.33	20.84	9.60	19.70
MILK PRICE	45.66		44.69	
INVENTORY ADJUSTMENT	3.89		4.02	
INTEREST ON EQUITY (%)	17.73		16.98	
INTEREST ON DEBT (%)	9.79		9.23	

Returns

Although income declined in 1987 due to milk price decreases, and cost has somewhat increased, the per cent return to equity remained almost unchanged at 16.5 per cent. The nominal value of the return declined from $9.73 per hectolitre to $8.99. However, higher indebtedness was responsible for the unchanged per cent return. Considering bank investment certificate rates or government bond rates, the 1987 return on dairy farms was very favourable.

One should keep in mind that the analysis does not include the value of the milk quota. This is a serious dilemma for new entrants. When actual payment for milk quota has been made the return is then diluted to 6.95 per cent.

TABLE 8 RETURN TO EQUITY

	1987 Study	Including Quota Value
1. Dairy Investment ($)	316,444	598,190
2. Debt ($)	110,263	110,263
3. Equity ($)	206,181	487,927
4. Equity ($/hL)	54.64	129.30
5. Blend Price	44.77	44.77
6. Other Credits	3.99	3.99
7. Production Costs	39.77	39.77
8. Paid Interest	2.74	2.74
9. Return to Equity	8.99	8.99
10. % Return (9 ÷ 4)	16.47	6.95

Table 9 illustrates the acceptable total debt load per cow at various levels of milk production and interest rates. The basic repayment capacity is given by gross return, for example, money available for resource ownership payment, consisting of rent, depreciation, paid and equity interest ($952 per cow). This table should be used as a guide-line only, each individual situation is different.

TABLE 9 ACCEPTABLE TOTAL DEBT LOAD PER COW

Milk Production	Interest Rate*	10 %	11 %	12 %	13 %	14 %	15 %
4,500	(hL/cow)	5551	5192	4810	4580	4318	4081
5,500		6785	6347	5953	5599	5279	4989
6,000		7398	6920	6491	6105	5755	5439
6,500		8020	7501	7036	6617	6239	5896
7,000		8633	8075	7574	7123	6716	6347

* At 20 Years Repayment Period.

Price Formula Comparison With Cost Study Results

Table 10 compares the 1987 cost study with the results of the formula price. Over the years the composite index of the formula was responsible for an increase of 128 per cent in the Class 1 price, which in turn contributed to the increase in the effective blend price received by the producers. The supply factors of the formula increased for the same period by 133 per cent, while the estimated cost of production increased by 129 per cent.

The results indicate that the formula, with minor discrepancies, performed quite well, and has been consistent with the study results. The return to equity per hectolitre increased over the 1973 base by 80.2 per cent, and the asset value increased by 62.7 for the period, leaving 16.5 per cent return to equity compared to 15 per cent in 1973.

Inflation plays an important role in comparing returns for different periods. If the nominal return is discounted by the inflation rate, the resultant "real return" is more meaningful for comparison.

Two factors in respect to the comparison between cost study and the formula should be mentioned. Namely, the technology change such as increases in milk production over the years, contributed 4.7 points in the 16.5 return. From Table 10, the equity per farm increased by 127.8 per cent over the 1973 base, however the same equity value per hectolitre increased by only 62.7 per cent because of the improvements in productivity. Secondly, the short term government assistance may

have contributed to the changes in farm return. The continuation of these programs is unknown.

By and large, the formula adequately responded to the stable trend in cost of production in 1987, triggering class 1 milk price once upwards and once downwards.

TABLE 10 COMPARISON OF 1987 DAIRY STUDY RESULTS WITH MILK PRICE FORMULA

		1973 Base	1987 Study	% Change
1.	Dairy Investment ($)	90,513	316,444	249.6
2.	Debt ($)	N/A	110,263	N/A
3.	Equity ($)	90,513	206,180	127.8
4.	Equity ($/hL)	33.58	54.64	62.7
5.	Blend Price	19.36	44.77	131.3
6.	Other Credits	3.02	3.99	32.1
7.	Production Costs	17.39	39.77	128.7
8.	Paid Interest	N/A	2.74	N/A
9.	Return to Equity	4.99	8.99	80.2
10.	% Return (9 ÷ 4)	15	16.5	--
11.	Class 1 Price	21.04	47.90	127.7
12.	Price Formula Indices	100.00	227.3	127.3
13.	Price Formula Supply Indices	100.00	233.55	133.5

Management Profile

Dairy management is concerned with the organizing, planning, directing and supervising of a dairy business. Dairy farmers carry out these functions. In addition, many farmers provide their own labour.

Table 11 provides a cross-section of values of management factors. Estimates for the top 1/3 are given on the first line and the estimates for the bottom 1/3 groups are on the second line. For instance, the top 1/3 group in feeding spent $1,029 per cow, while the bottom 1/3 group spent only $566.30 per cow. Milk production per cow for the two groups was 7121 litres and 6012 litres, respectively, and cost of producing a hectolitre was $42.44 and $38.06, respectively.

The overall level of management was determined by five factors:

1. Milk production per cow.
2. Total cost per hectolitre of milk.
3. Milk production for hours of work.
4. Feed conversion.
5. Milk production for dollar of investment.

Top 1/3 producers in all five factors were rated 3 and bottom 1/3 were rated 1. The last column in Table 11 indicates a blend of 1 and 3 for each factor, depending on whether that group had more top managers (closer to 3) or not.

Several conclusions can be derived from Table 11. Producers who are relatively new in dairy (5.6 years) have debt/capital ratio of 0.45, while for most established producers (30.3 years) indebtedness was reduced to 17%. The cost and milk production for the top 1/3 management group were better by 10.0 and 4.6 per cent than the provincial average.

TABLE 11

PROFILE OF MANAGEMENT FACTORS FOR TOP 1/3 AND BOTTOM 1/3 OF PRODUCERS

TOP 1/3 BOTTOM 1/3 AVERAGES FOR:	MILK PRODUC L/COW	TOTAL COST $/hL	YEARS IN DAIRY	HERD SIZE	INVES PER COW	DEBT/ CAPITAL RATIO	EQUITY RETURN %	FEED COST $/COW	LABOUR HR/COW	OVERALL MGMT RATING
MILK PRODUCTION L/COW	7625	39.95	18.5	65.8	6523	0.37	24.2	954.1	80	2.3
	5502	40.35	16.1	55.9	4502	0.21	16.5	658.5	83	1.6
TOTAL COST $/hL	6794	46.55	19.1	61.3	6428	0.35	7.7	870.7	96	1.4
	6549	33.78	17.7	75.0	4985	0.22	26.8	741.6	69	2.3
YEARS IN DAIRY	6613	40.52	30.3	71.6	5556	0.17	16.2	770.5	82	1.9
	6659	38.46	5.6	65.9	5558	0.45	24.6	780.6	79	2.0
HERD SIZE	6655	39.26	17.1	88.2	5387	0.32	19.9	808.9	78	2.0
	6693	38.11	15.1	37.7	5427	0.28	20.3	757.7	87	1.9
INVESTMENT PER COW	7415	41.25	20.7	69.3	7263	0.35	12.9	856.9	80	1.9
	5894	36.31	17.0	67.4	3851	0.26	29.0	682.3	75	2.2
DEBT/CAPITAL RATIO	6787	41.53	11.8	71.8	5917	0.61	25.3	842.5	82	1.9
	6321	37.92	21.4	64.1	4665	0.05	18.9	778.7	87	1.9
EQUITY RETURN %	6729	36.86	13.5	76.0	4835	0.45	38.7	818.2	77	2.3
	6460	45.57	18.2	59.9	6262	0.26	3.8	799.2	95	1.3
FEED COST $/COW	7121	42.44	14.4	68.9	5746	0.40	21.8	1028.7	88	1.9
	6012	38.06	16.9	63.3	5403	0.36	20.6	566.0	78	1.8
LABOUR HR/COW	6583	44.71	14.4	55.8	5487	0.31	13.4	857.8	103	1.4
	6538	36.16	13.0	76.0	5217	0.42	29.7	793.1	62	2.4
OVERALL MANAGEMENT RATING	6872	35.80	15.5	68.9	4774	0.38	33.8	806.1	71	3.0
	6217	44.25	18.0	67.3	5986	0.33	10.7	762.3	94	1.0

Each line contains values for the same top 1/3 and bottom 1/3 group, set by the left hand side factor.

Overall management is rated 1 for the low group and 3 for the high.

APPENDIX A

ALBERTA

AVERAGE FARM SUMMARIES

ALBERTA (59)

TABLE 1 ***** DAIRY ENTERPRISE COSTS AND RETURNS *****
1987

	TOTAL ENTERPRISE	PER COW	PER HL. SOLD	PERCENT FROM INCOME
INCOME:				
MILK SALES	169559.48	2865.31	44.90	
MILK SUBSIDY	9383.74	158.57	2.48	
MILK LEVIES (-)	-9865.33	-166.71	-2.61	
MISCELLANEOUS RECEIPTS	1061.81	17.94	0.28	
NET CATTLE SALES (+-)	12051.18	203.65	3.19	
NET INVENTORY INCREASE (+-)	1956.87	33.07	0.52	
GROSS INCOME	184147.75	3111.83	48.76	100.00
EXPENSES:				
GRAIN	4990.91	84.34	1.32	
COMPLETE FEED	14755.98	249.35	3.91	
SUPPLEMENT	4425.10	74.78	1.17	
MINERALS & VITAMINS	1014.46	17.14	0.27	
ROUGHAGE	21533.29	363.88	5.70	
PROCESSING COSTS	336.15	5.68	0.09	
TOTAL FEED COSTS	47055.89	795.18	12.46	25.55
BEDDING AND SUPPLIES	4674.88	79.00	1.24	
VET. AND MEDICINE	4785.50	80.87	1.27	
MILK HAULING	6351.33	107.33	1.68	
PRODUCER'S FEES	2849.56	48.15	0.75	
UTILITIES	4087.47	69.07	1.08	
FUEL, OIL, LUBE	2033.21	34.36	0.54	
BLDG. & MACH. REPAIRS	6766.17	114.34	1.79	
TAXES AND INSURANCE	2398.52	40.53	0.64	
MISCELLANEOUS	5915.53	99.96	1.57	
TOTAL OTHER COSTS	39862.16	673.61	10.56	21.65
HIRED LABOR	11425.50	193.07	3.03	
FAMILY LABOR	25429.07	429.71	6.73	
TOTAL LABOR COSTS	36854.57	622.79	9.76	20.01
TOTAL OPERATING COSTS	123772.62	2091.58	32.78	
RENT	1723.81	29.13	0.46	
DEPRECIATION	14344.64	242.40	3.80	
INTEREST (CAP.DEBT)	10350.11	174.90	2.74	
TOTAL CAPITAL COSTS	26418.56	446.43	7.00	14.35
TOTAL PRODUCTION COST	150191.18	2538.01	39.77	81.56
RETURN TO CAPITAL	60375.13	1020.25	15.99	
RETURN TO EQUITY	33956.57	573.82	8.99	18.44
MILK PRICE			44.77	
INVENTORY ADJUSTMENT			3.99	
INTEREST ON EQUITY (%)			16.47	
INTEREST ON DEBT (%)			9.39	

ALBERTA (59)

TABLE 2 ***** STATEMENT OF INVESTMENT *****
1987

LAND BUILDINGS & EQUIPMENT	AGE	DEPRECIATION	DAIRY INVESTMENT
DAIRY BUILDINGS	9.59	5078.71	119432.04
POWER MACHINERY	5.29	3442.85	23317.19
DAIRY EQUIPMENT	6.55	5139.88	24686.79
OTHER EQUIPMENT	5.45	683.20	3430.15
TOTAL EQUIPMENT	5.77	9265.93	51434.13
LAND			16566.57
SUPPLIES			3927.69
** SUBTOTAL **		14344.64	191360.42

DAIRY LIVESTOCK	--BEGIN YEAR---- NUMBER	VALUE	--END OF YEAR--- NUMBER	VALUE	AVERAGE VALUE
COWS	58.98	96644.27	59.71	97830.78	97237.52
BRED HEIFERS	15.76	14970.69	14.86	14118.97	14544.83
OPEN HEIFERS	14.81	7405.17	17.21	8603.45	8004.31
HEIFER CALVES	21.48	4296.55	23.02	4603.45	4450.00
BULL CALVES	5.12	291.79	7.17	408.70	350.25
BULLS	0.41	496.55	0.41	496.55	496.55
** SUBTOTAL **	116.57	124105.02	122.38	126061.90	125083.46

TOTAL DAIRY INVESTMENT	316443.88
CAPITAL LOANS	110263.41
OPERATOR EQUITY	206180.47
INVESTMENT PER COW	5347.44
DEBT/CAPITAL RATIO	0.35
CAPITAL TURNOVER (YR)	1.72

------HERD SIZE------

NUMBER OF DAIRY COWS	59.18
NUMBER OF ANIMAL UNITS	91.56
DRY COWS (%)	15.65
CALF CROP (%)	79.16
PASTURE PER COW (AC.)	0.94

-----CATTLE SALES & PURCHASES-----

	NUMBER	SELLING PRICE	NUMBER	PURCHASE PRICE
COWS	18.64	702.89	3.83	1106.17
BRED HEIFERS	0.91	893.36	0.48	1269.82
OPEN HEIFERS	1.28	626.82	0.22	627.15
HEIFER CALVES	1.21	207.91	0.60	292.14
BULL CALVES	18.03	119.90	0.22	90.77
BULLS	0.28	1089.19	0.16	1255.56
TOTAL VALUE		17430.18		5379.00

ALBERTA (59)

TABLE 3 ***** LABOUR AND MANAGEMENT *****
1987

LABOUR	HOURS	VALUE	HOURLY RATE
OPERATOR LABOR	2346.05	19941.44	8.50
HIRED LABOR	1394.82	11425.50	8.19
FAMILY UNPAID LABOR	1035.58	5487.63	5.30
TOTAL	4776.45	36854.57	7.72

RETURN TO FAMILY LABOR	10.85	$/HR.
MAN EQUIVALENTS	1.91	
LABOR HOURS PER COW	80.72	
YEARS FARMING	16.22	

MILK PRODUCTION	HL.	% OF TOTAL	VALUE	PRICE
QUOTA MILK	2685.05	69.06	125135.97	46.60
OVER QUOTA MILK	1070.11	27.52	43446.72	40.60
OTHER MILK SALES	18.28	0.47	834.91	45.68
FED TO LIVESTOCK	114.71	2.95	5150.34	44.90
TOTAL	3888.15	100.00	174567.94	44.90

FLUID QUOTA	710.26	LITRES/DAY
CLASS 1 UTILIZATION	75.44	%
BUTTERFAT TEST	3.72	KG/HL
MILK PRODUCTION PER COW	6570.41	LITRES

MANAGEMENT FACTORS

COST PER HL	39.77	
MILK/FEED (KG) RATIO	1.86	LITRES
MILK/LABOUR (HR) RATIO	81.40	LITRES
MILK/CAPITAL ($) RATIO	1.23	LITRES

ALBERTA (59)

TABLE 4

***** FEED REPORT *****
1987

CONCENTRATES	----PURCHASED----- QUANTITY (TONNES)	PRICE	----HOMEGROWN----- QUANTITY (TONNES)	PRICE
OATS	0.99	65.16	7.72	49.26
BARLEY	15.81	50.68	48.10	43.96
WHEAT			0.18	56.82
MIXED GRAIN	1.56	83.33	12.09	46.52
BREW GRAIN (DRY EQ.)	9.82	86.65		
BEET PULP	2.02	26.58		
DAIRY RATION	92.27	150.99		
CALF FEED	3.10	266.10		
SUPPLEMENT	13.45	329.06		
MOLASSES	0.07	303.70		
SALT	0.67	293.00		
MINERALS & VITAMINS	1.26	648.06		
SUBTOTAL ----------	141.03	22118.38	68.10	3068.07
ROUGHAGE				
ALFALFA HAY	50.35	77.06	147.27	61.64
ALFALFA PELLETS				
STRAW FED	0.20	25.98	2.77	25.00
GREENFEED	1.60	45.50	11.12	42.98
SILAGE (DRY EQ.)	14.33	81.43	118.74	57.13
SUBTOTAL ----------	66.48	5124.99	279.91	16408.30
GRINDING		336.15		
GRAND TOTAL FEED COSTS ----------		27579.52		19476.36
BEDDING STRAW	16.59	29.24	27.99	24.96

AV.PRICE: CONCENTRATE	120.43	$/TONNE
ROUGHAGE	62.16	$/TONNE
FED PER COW: CONCENTRATE	3.53	TONNES
ROUGHAGE	5.85	TONNES
% HOME GROWN: CONCENTRATE	32.56	%
ROUGHAGE	80.81	%

APPENDIX B

NORTHERN ALBERTA

AVERAGE FARM SUMMARIES

NORTHERN ALBERTA (35)

TABLE 1 ***** DAIRY ENTERPRISE COSTS AND RETURNS *****
1987

	TOTAL ENTERPRISE	PER COW	PER HL. SOLD	PERCENT FROM INCOME
INCOME:				
MILK SALES	154761.70	2825.00	44.94	
MILK SUBSIDY	8885.70	162.20	2.58	
MILK LEVIES (-)	-9220.30	-168.31	-2.68	
MISCELLANEOUS RECEIPTS	933.52	17.04	0.27	
NET CATTLE SALES (+-)	9346.67	170.61	2.71	
NET INVENTORY INCREASE (+-)	3332.80	60.84	0.97	
GROSS INCOME	168040.08	3067.39	48.80	100.00
EXPENSES:				
GRAIN	4638.86	84.68	1.35	
COMPLETE FEED	10371.86	189.33	3.01	
SUPPLEMENT	5595.21	102.13	1.62	
MINERALS & VITAMINS	1028.56	18.78	0.30	
ROUGHAGE	19598.06	357.74	5.69	
PROCESSING COSTS	468.02	8.54	0.14	
TOTAL FEED COSTS	41700.56	761.20	12.11	24.82
BEDDING AND SUPPLIES	4105.11	74.93	1.19	
VET. AND MEDICINE	4537.42	82.83	1.32	
MILK HAULING	5518.73	100.74	1.60	
PRODUCER'S FEES	2982.05	54.43	0.87	
UTILITIES	3623.48	66.14	1.05	
FUEL, OIL, LUBE	1903.39	34.74	0.55	
BLDG. & MACH. REPAIRS	6626.93	120.97	1.92	
TAXES AND INSURANCE	2225.30	40.62	0.65	
MISCELLANEOUS	5433.80	99.19	1.58	
TOTAL OTHER COSTS	36956.23	674.60	10.73	21.99
HIRED LABOR	10480.36	191.31	3.04	
FAMILY LABOR	24948.54	455.41	7.25	
TOTAL LABOR COSTS	35428.91	646.72	10.29	21.08
TOTAL OPERATING COSTS	114085.70	2082.51	33.13	
RENT	1560.09	28.48	0.45	
DEPRECIATION	13247.12	241.81	3.85	
INTEREST (CAP.DEBT)	10134.30	184.99	2.94	
TOTAL CAPITAL COSTS	24941.51	455.28	7.24	14.84
TOTAL PRODUCTION COST	139027.21	2537.79	40.37	82.73
RETURN TO CAPITAL	53954.38	984.88	15.67	
RETURN TO EQUITY	29012.87	529.60	8.43	17.27
MILK PRICE			44.85	
INVENTORY ADJUSTMENT			3.95	
INTEREST ON EQUITY (%)			15.95	
INTEREST ON DEBT (%)			9.52	

NORTHERN ALBERTA (35)

TABLE 2 ***** STATEMENT OF INVESTMENT *****
1987

LAND BUILDINGS & EQUIPMENT	AGE	DEPRECIATION	DAIRY INVESTMENT
DAIRY BUILDINGS	9.56	4620.73	108645.37
POWER MACHINERY	5.32	3162.68	21409.48
DAIRY EQUIPMENT	6.47	4952.44	23863.76
OTHER EQUIPMENT	5.86	511.27	2525.38
TOTAL EQUIPMENT	5.79	8626.40	47798.63
LAND			12231.65
SUPPLIES			3620.60
** SUBTOTAL **		13247.12	172296.25

DAIRY LIVESTOCK	--BEGIN YEAR---- NUMBER	VALUE	--END OF YEAR--- NUMBER	VALUE	AVERAGE VALUE
COWS	54.79	89496.83	56.42	92169.85	90833.34
BRED HEIFERS	14.70	13962.12	12.82	12177.27	13069.70
OPEN HEIFERS	12.30	6151.52	16.79	8393.94	7272.73
HEIFER CALVES	19.76	3951.52	20.55	4109.09	4030.30
BULL CALVES	5.76	366.39	7.03	447.38	406.89
BULLS	0.42	509.09	0.39	472.73	490.91
** SUBTOTAL **	107.73	114437.46	114.00	117770.27	116103.87
TOTAL DAIRY INVESTMENT					288400.11
CAPITAL LOANS					106492.42
OPERATOR EQUITY					181907.69
INVESTMENT PER COW					5264.43
DEBT/CAPITAL RATIO					0.37
CAPITAL TURNOVER (YR)					1.72

------HERD SIZE------

NUMBER OF DAIRY COWS	54.78
NUMBER OF ANIMAL UNITS	85.75
DRY COWS (%)	16.37
CALF CROP (%)	75.12
PASTURE PER COW (AC.)	0.84

-----CATTLE SALES & PURCHASES-----

	NUMBER	SELLING PRICE	NUMBER	PURCHASE PRICE
COWS	17.42	653.82	4.91	1085.32
BRED HEIFERS	1.21	834.82	0.30	1254.50
OPEN HEIFERS	1.36	634.02	0.33	686.64
HEIFER CALVES	0.94	213.45	0.91	322.83
BULL CALVES	16.03	118.98		
BULLS	0.30	1021.60	0.09	1200.00
TOTAL VALUE		15686.21		6339.55

NORTHERN ALBERTA (35)

TABLE 3 ***** LABOUR AND MANAGEMENT *****
1987

LABOUR	HOURS	VALUE	HOURLY RATE
OPERATOR LABOR	2288.21	19449.80	8.50
HIRED LABOR	1407.34	10480.36	7.45
FAMILY UNPAID LABOR	1023.55	5498.74	5.37
TOTAL	4719.10	35428.91	7.51

RETURN TO FAMILY LABOR	10.25	$/HR.
MAN EQUIVALENTS	1.89	
LABOR HOURS PER COW	86.14	
YEARS FARMING	13.15	

MILK PRODUCTION	HL.	% OF TOTAL	VALUE	PRICE
QUOTA MILK	2409.60	67.96	112527.12	46.70
OVER QUOTA MILK	1021.73	28.82	41687.76	40.80
OTHER MILK SALES	11.96	0.34	538.64	45.04
FED TO LIVESTOCK	102.26	2.88	4595.89	44.94
TOTAL	3545.55	100.00	159349.41	44.94

FLUID QUOTA	645.76	LITRES/DAY
CLASS 1 UTILIZATION	75.44	%
BUTTERFAT TEST	3.74	KG/HL
MILK PRODUCTION PER COW	6472.01	LITRES

MANAGEMENT FACTORS

COST PER HL	40.37	
MILK/FEED (KG) RATIO	1.91	LITRES
MILK/LABOUR (HR) RATIO	75.13	LITRES
MILK/CAPITAL ($) RATIO	1.23	LITRES

NORTHERN ALBERTA (35)

TABLE 4

***** FEED REPORT *****
1987

CONCENTRATES	----PURCHASED----- QUANTITY (TONNES)	PRICE	----HOMEGROWN----- QUANTITY (TONNES)	PRICE
OATS	1.74	65.16	5.37	48.70
BARLEY	22.87	49.86	50.45	43.93
WHEAT			0.32	56.82
MIXED GRAIN	0.11	71.10	17.40	46.23
BREW GRAIN (DRY EQ.)				
BEET PULP	3.29	16.88		
DAIRY RATION	63.17	153.24		
CALF FEED	2.17	318.54		
SUPPLEMENT	16.70	335.03		
MOLASSES	0.07	300.43		
SALT	0.78	281.66		
MINERALS & VITAMINS	1.33	608.91		
SUBTOTAL ----------	112.24	18334.01	73.54	3300.47
ROUGHAGE				
ALFALFA HAY	45.15	74.60	148.71	61.75
ALFALFA PELLETS				
STRAW FED	0.05	32.00	4.16	25.00
GREENFEED	2.50	45.81	7.66	43.24
SILAGE (DRY EQ.)	18.20	84.98	85.73	57.73
SUBTOTAL ----------	65.90	5030.98	246.25	14567.08
GRINDING		468.02		
GRAND TOTAL FEED COSTS ----------		23833.01		17867.55
BEDDING STRAW	12.17	29.53	30.77	25.00

AV.PRICE: CONCENTRATE	116.45	$/TONNE
ROUGHAGE	62.78	$/TONNE
FED PER COW: CONCENTRATE	3.39	TONNES
ROUGHAGE	5.70	TONNES
% HOME GROWN: CONCENTRATE	39.59	%
ROUGHAGE	78.89	%

APPENDIX C

SOUTHERN ALBERTA

AVERAGE FARM SUMMARIES

SOUTHERN ALBERTA (24)

TABLE 1 ***** DAIRY ENTERPRISE COSTS AND RETURNS *****
1987

	TOTAL ENTERPRISE	PER COW	PER HL. SOLD	PERCENT FROM INCOME
INCOME:				
MILK SALES	189092.26	2910.16	44.86	
MILK SUBSIDY	10041.16	154.53	2.38	
MILK LEVIES (-)	-10716.76	-164.93	-2.54	
MISCELLANEOUS RECEIPTS	1231.16	18.95	0.29	
NET CATTLE SALES (+-)	15621.13	240.41	3.71	
NET INVENTORY INCREASE (+-)	110.80	1.71	0.03	
GROSS INCOME	205379.75	3160.82	48.72	100.00
EXPENSES:				
GRAIN	5455.61	83.96	1.29	
COMPLETE FEED	20543.02	316.16	4.87	
SUPPLEMENT	2880.55	44.33	0.68	
MINERALS & VITAMINS	995.86	15.33	0.24	
ROUGHAGE	24087.79	370.71	5.71	
PROCESSING COSTS	162.08	2.49	0.04	
TOTAL FEED COSTS	54124.92	832.99	12.84	26.35
BEDDING AND SUPPLIES	5426.98	83.52	1.29	
VET. AND MEDICINE	5112.96	78.69	1.21	
MILK HAULING	7450.36	114.66	1.77	
PRODUCER'S FEES	2674.67	41.16	0.63	
UTILITIES	4699.92	72.33	1.11	
FUEL, OIL, LUBE	2204.56	33.93	0.52	
BLDG. & MACH. REPAIRS	6949.98	106.96	1.65	
TAXES AND INSURANCE	2627.16	40.43	0.62	
MISCELLANEOUS	6551.40	100.83	1.55	
TOTAL OTHER COSTS	43697.99	672.52	10.37	21.28
HIRED LABOR	12673.08	195.04	3.01	
FAMILY LABOR	26063.37	401.12	6.18	
TOTAL LABOR COSTS	38736.46	596.16	9.19	18.86
TOTAL OPERATING COSTS	136559.36	2101.67	32.39	
RENT	1939.92	29.86	0.46	
DEPRECIATION	15793.37	243.06	3.75	
INTEREST (CAP.DEBT)	10634.98	163.67	2.52	
TOTAL CAPITAL COSTS	28368.27	436.59	6.73	13.81
TOTAL PRODUCTION COST	164927.63	2538.26	39.12	80.30
RETURN TO CAPITAL	68820.39	1059.16	16.33	
RETURN TO EQUITY	40452.13	622.56	9.60	19.70
MILK PRICE			44.69	
INVENTORY ADJUSTMENT			4.02	
INTEREST ON EQUITY (%)			16.98	
INTEREST ON DEBT (%)			9.23	

SOUTHERN ALBERTA (24)

TABLE 2 ***** STATEMENT OF INVESTMENT *****
1987

LAND BUILDINGS & EQUIPMENT	AGE	DEPRECIATION	DAIRY INVESTMENT
DAIRY BUILDINGS	9.63	5683.25	133670.41
POWER MACHINERY	5.25	3812.67	25836.82
DAIRY EQUIPMENT	6.64	5387.29	25773.18
OTHER EQUIPMENT	5.22	910.15	4610.81
TOTAL EQUIPMENT	5.75	10110.11	56220.81
LAND			22288.65
SUPPLIES			4333.04
** SUBTOTAL **		15793.37	216512.91

DAIRY LIVESTOCK	--BEGIN YEAR---- NUMBER	VALUE	--END OF YEAR--- NUMBER	VALUE	AVERAGE VALUE
COWS	64.52	106143.14	64.04	105353.48	105748.31
BRED HEIFERS	17.16	16302.00	17.56	16682.00	16492.00
OPEN HEIFERS	18.12	9060.00	17.76	8880.00	8970.00
HEIFER CALVES	23.76	4752.00	26.28	5256.00	5004.00
BULL CALVES	4.28	206.30	7.36	354.75	280.52
BULLS	0.40	480.00	0.44	528.00	504.00
** SUBTOTAL **	128.24	136943.44	133.44	137054.24	136998.84

TOTAL DAIRY INVESTMENT	353511.75
CAPITAL LOANS	115241.13
OPERATOR EQUITY	238270.62
INVESTMENT PER COW	5440.60
DEBT/CAPITAL RATIO	0.33
CAPITAL TURNOVER (YR)	1.72

------HERD SIZE------

NUMBER OF DAIRY COWS	64.98
NUMBER OF ANIMAL UNITS	99.24
DRY COWS (%)	14.85
CALF CROP (%)	83.66
PASTURE PER COW (AC.)	1.06

-----CATTLE SALES & PURCHASES-----

	NUMBER	SELLING PRICE	NUMBER	PURCHASE PRICE
COWS	20.24	758.66	2.40	1162.45
BRED HEIFERS	0.52	1073.46	0.72	1278.33
OPEN HEIFERS	1.16	615.66	0.08	300.00
HEIFER CALVES	1.56	203.51	0.20	108.00
BULL CALVES	20.68	120.83	0.52	90.77
BULLS	0.24	1201.83	0.24	1283.33
TOTAL VALUE		19732.21		4111.08

SOUTHERN ALBERTA (24)

TABLE 3 ***** LABOUR AND MANAGEMENT *****
1987

LABOUR	HOURS	VALUE	HOURLY RATE
OPERATOR LABOR	2422.40	20590.40	8.50
HIRED LABOR	1378.30	12673.08	9.19
FAMILY UNPAID LABOR	1051.46	5472.97	5.21
TOTAL	4852.16	38736.46	7.98

RETURN TO FAMILY LABOR	11.60	$/HR.
MAN EQUIVALENTS	1.94	
LABOR HOURS PER COW	74.68	
YEARS FARMING	20.28	

MILK PRODUCTION	HL.	% OF TOTAL	VALUE	PRICE
QUOTA MILK	3048.65	70.24	141779.64	46.51
OVER QUOTA MILK	1133.97	26.13	45768.56	40.36
OTHER MILK SALES	26.61	0.61	1225.70	46.06
FED TO LIVESTOCK	131.15	3.02	5881.88	44.85
TOTAL	4340.39	100.00	194655.78	44.85

FLUID QUOTA	795.40	LITRES/DAY
CLASS 1 UTILIZATION	75.44	%
BUTTERFAT TEST	3.69	KG/HL
MILK PRODUCTION PER COW	6679.92	LITRES

MANAGEMENT FACTORS

COST PER HL	39.12	
MILK/FEED (KG) RATIO	1.81	LITRES
MILK/LABOUR (HR) RATIO	89.45	LITRES
MILK/CAPITAL ($) RATIO	1.23	LITRES

SOUTHERN ALBERTA (24)

TABLE 4

***** FEED REPORT *****
1987

CONCENTRATES	----PURCHASED----- QUANTITY (TONNES)	PRICE	----HOMEGROWN----- QUANTITY (TONNES)	PRICE
OATS			10.83	49.62
BARLEY	6.50	54.50	45.01	44.00
WHEAT				
MIXED GRAIN	3.48	83.86	5.08	47.87
BREW GRAIN (DRY EQ.)	22.79	86.65		
BEET PULP	0.34	149.53		
DAIRY RATION	130.67	149.55		
CALF FEED	4.32	231.32		
SUPPLEMENT	9.15	314.69		
MOLASSES	0.07	307.80		
SALT	0.53	315.22		
MINERALS & VITAMINS	1.17	706.47		
SUBTOTAL ----------	179.04	27113.76	60.92	2761.29
ROUGHAGE				
ALFALFA HAY	57.22	79.61	145.37	61.48
ALFALFA PELLETS				
STRAW FED	0.41	25.10	0.95	25.00
GREENFEED	0.40	43.00	15.70	42.82
SILAGE (DRY EQ.)	9.23	72.20	162.32	56.71
SUBTOTAL ----------	67.26	5249.08	324.34	18838.71
GRINDING		162.08		
GRAND TOTAL FEED COSTS ----------		32524.92		21599.99
BEDDING STRAW	22.42	29.03	24.32	24.90

AV.PRICE: CONCENTRATE	124.50	$/TONNE
ROUGHAGE	61.51	$/TONNE
FED PER COW: CONCENTRATE	3.69	TONNES
ROUGHAGE	6.03	TONNES
% HOME GROWN: CONCENTRATE	25.39	%
ROUGHAGE	82.83	%

APPENDIX D

MONTHLY QUESTIONNAIRE

Alberta
AGRICULTURE
Production Economics Branch
7000 - 113 Street
Edmonton, Alberta, T6H 5T6
427-4005

DAIRY COST SURVEY

MONTH: _____

NAME: _____ YEAR: _____

DAIRY HERD:	Beginning No.	Purchases No.	Purchases Value	No. Born	No. Died	Sales No.	Sales Value	End No.
Cows Milking		02					04	
Cows Dry								
Bred Heifers								
Open Heifers								
Heifer Calves								05
Bull Calves			03					
Herd Bulls								

SALES: Specify

Private Milk Sales (Litres)	
(Value)	
Milk fed to Livestock (Liters)	
Milk Home Use (Litres)	
Miscellaneous Income (specify)	

CAPITAL PURCHASES:		Total Value	% to Dairy
Equipment:	Purchases		
	Sales		
Tractor, Truck, Auto:	Purchases	06	
	Sales		
Buildings:	Purchases (or completed constr.)		
	Sales		07
Fluid Quota; Sold ☐ or Purchased ☐			Lit.

OFFICE USE		OFFICE USE	OFFICE USE
Quota Milk (L)	07	Freight	
(Value)		Fees	
Over Quota (L)		Butterfat Test	08
(Value)		Utilization	
Subsidy		Levy Refund	
Levies			

FEED:	Tonnes Fed	Price if Purchased	Office Use	FEED:	Tonnes Fed	Price
Barley				Dairy Ration		
Oats				Supplement		
Wheat				Calf Feed (kg)		
Mix Grain				Salt (kg)		
Hay				Min. & Vit (kg)		
Silage				Brew Grain		
Greenfeed	09			Beet Pulp		
Strawfeed		10	11	Molasses	12	
Bed. Straw				Alfalfa Pellets		13
				Grinding Charges		

LABOUR:	Dairy Chores Only	Hours	Wages & Board
Operator		13	
Unpaid Labour	1.		
	2.		
	3. (under 18)		
Hired Paid Labour	1.		
	2.		14
	3.		

EXPENSES:	Particulars	Total Farm ($)	Dairy Portion ($)
Vet. & Medicine			
Barn Supplies			
Building & Fence Repairs & Hardware			
Machinery & Equipment Repairs			
Fuel, Oil, Lube			
Utilities			
Insurance & Licences			
Property Taxes			
Cash Rental			15
Operating Loan Interest			
Other Expenses			

Alberta
AGRICULTURE
Production Economics Branch
7000 - 113 Street
Edmonton, alberta T6H 5T6
427-4005

DAIRY COST SURVEY — INVESTMENT

Name: _____ Year: _____

LOANS	OWING JAN 1	INTEREST RATE	DAIRY %
LAND			29
BUILDINGS			
LIVESTOCK	28	28	
MACHINERY			

SUPPLIES	VALUE JAN 1		
GAS OIL GREASE			
POSTS AND WIRE			
SHAVINGS			30
DAIRY LIVESTOCK SUPPLIES			
RATIONS & SUPPLEMENTS			
OTHER SUPPLIES			

OFFICE USE ONLY

BEGINNING YEAR	NUMBER	PRICE	
COWS	27		
BRED HEIFERS			
OPEN HEIFERS			
HEIFER CALVES			
BULL CALVES			
BULLS			

BUILDINGS USED FOR DAIRY	PURCHASED PRICE	YEARS KEPT	DAIRY %
	16		
		20	
			24

TRACTORS & TRUCKS USED FOR DAIRY			
	17		
		21	

DAIRY EQUIPMENT			
	18		
		22	

OTHER EQUIPMENT USED FOR DAIRY			
			25
	19		
		23	

BLDG SITE ACRES: CURRENT $/ACRE:			
DAIRY PASTURE VALUE		ACRES:	
FLUID MILK QUOTA (L)			
YEARS IN BUSINESS			
% DAIRY INCOME FROM TOTAL FARM			

APPENDIX E

ALBERTA MILK PRICE FORMULA

Milk sold for consumption in fluid form in Alberta is priced at the producer, wholesale and retail levels by the Public Utilities Board. This is a common procedure in that, for many years, appointed bodies in Canada and the U.S.A. have issued pricing orders designed to ensure adequate supplies of milk for the consuming public. The orders are made following public hearings at which producers, consumer and industry representatives make submission. All systems incorporate some type of quota allocation among milk producers which, when associated with the first grade milk price, provides the incentive to maintain the flow of milk in the cold winter months as well as in the summer.

Formula Pricing

A modification of the above procedure is known as "formula pricing", whereby an equitable price for first grade milk is determined through the use of selected statistical indicators. As milk is considered an essential food in the modern diet, the interests of consumers as well as producers must be considered in the pricing mechanism. Thus an "economic formula", incorporating supply and demand components, is normally used to determine the producer price.

Formula Development in Alberta

In 1973, the Production & Resource Economics Branch designed a formula process to permit a comparison with milk price levels over the previous ten years. It was adopted for experimentation over a 12 month period from August, 1973 to August, 1974. Upon presentation and discussion of the results at a hearing in Red Deer in August 1974, the Public Utilities Board ordered the Formula to be used as a pricing mechanism for a test period of one year starting in October, and to be accompanied with a cost of production program to monitor its suitability and to assess adjustments in the formula components if required at the end of the period.

The Alberta Formula

The Alberta Formula consists of seven statistical factors or components. The first five represent the producer's major cost components and return, and therefore are a reflection of his willingness to sell. The last two represent the approximation of demand of the consumers. The weight given to each factor was established with reference to the actual cost structure on the supply side and relative demand elasticities was a guide for setting the weight of the demand side.

TABLE 1
Components of the Alberta Formula

Components		Weighting
1.	Price of 16% dairy feed $/Tonne (Alberta)	14
2.	Price of Alfalfa Hay $/Ton (Alberta)	14
3.	Index of Farm Wages (Western Canada)	12
4.	Index of Farm Inputs (Western Canada)	20
5.	Index of Consumer Prices (Canada)	10
6.	Average Weekly Industrial Wages (Alberta)	16
7.	Per Capita Sales of Milk Litres/Month (Alberta)	14
	COMPOSITE	100

Application

A base price of $21.04 per hectolitre for No. 1 milk was established as at August, 1973. This was determined from the results of the 1973 Dairy Cost Study and provided for a reurn of 15 per cent on sales income. The indices for the month of August, 1973 were converted to 100, which was then equated to the base price of $21.04. Subsequent monthly index conversions were then calculated relative to the base month, and subsequent monthly producer price levels were determined by multiplying the base price by the appropriate "combined indices".

Whenever the present Formula states a change of $0.49 per hL above or below the existing No. 1 producer price, the Public Utilities Board may make an adjustment of $0.98 to the producer and one cent per litre to the consumer.

Changes in the Formula price are calculated monthly by the Production & Resource Economics Branch and are forwarded to the Public Utilities Board in time to allow for notifications and price list adjustment by the milk processing firms for the succeeding month.

The current formula will be kept under observation and, subject to results of the cost study and observed statistical trends, will be reviewed from time to time.

PRODUCTION & RESOURCE ECONOMICS BRANCH
427-5397